Lynch, Nebr., navigation closed 22d. Yankton, S. Dak., running ice 22d; full of ice 23d; river closed 24th. Saint Joseph, Mo., slush ice in river 23d to 28th. Kansas City, Mo., much floating ice 24th.

Monongahela River.—Lock No. 4, Pa., frozen 26th; Pittsburg, Pa., frozen 26th.

Red River.—Saint Vincent, Minn., frozen, and ferry discontinued, 18th.

Ohio River.—Wheeling, W. Va., floating ice 26th and 27th.

Saint Croix River.—Osceola Mills, Wis., frozen 25th.

Susquehanna River.—Harrisburg, Pa., slush ice 25th. Lock Haven, Pa., thin ice 17th; clear 22d; frozen up 25th; clear 30th.

Wabash River.—Lafayette, Ind., frozen 24th.

Wisconsin River.—Stevens Point, Wis., frozen 15th.

Lake Erie.—Sandusky, Ohio, bay frozen 25th. Toledo, Ohio, ice in river 24th; river and bay frozen over and navigation hindered 25th; river free from ice 27th.

Lake Michigan.—Chicago, Ill., harbor frozen 25th.

Lake Minnetonka.—Minneapolis, Minn., frozen over 24th, the earliest date of freezing ever known.

Lake Pepin.—Lake Pepin, Wis., frozen 23d.

ATMOSPHERIC ELECTRICITY.

THUNDERSTORMS AND AURORAS.

The table on p. 327 shows in detail for November, 1893, (1) the number of stations from which meteorological reports were received; (2) the number of such stations reporting thunderstorms (T) and auroras (A), respectively, in each state and on each day of the month on which the phenomena were observed.

THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

The dates on which reports were most numerous are the 1st, 2d, 3d, 15th, 20th, 24th, 26th, 27th, and 29th.

The dates on which they were least numerous are the 5th, 6th, 9th, 10th, 11th, 14th, 15th, 28th, and 30th.

The states from which the most numerous thunderstorm reports were received were Florida, 30; Louisiana, 42; Texas, 35.

AURORAS.

The evenings on which the full moonlight must have interfered with ordinary observations were the 20th to 28th, inclusive; on the remaining 21 evenings 240 observations of auroras are reported, or an average of 11 daily; the dates on which the reported number exceeded this average are the 1st, 2d, and 3d. During these three evenings an extensive auroral display occurred, and observations are at hand from the following states on one or more of these dates: Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

The following table gives an abstract of auroral observations made on the evening of the 1st and morning of the 2d:

Auroral display of November 1st.

Date.	Station.	Extent of display.		Remarks.
		Azimuth.	Altitude.	
		°	°	
1	Eastport, Me	.....	30	Waves of light shooting from w. to e. and extending to zenith.
1	Boston, Mass	.....	60	Glow changing to red and yellow.
1	Woods Holl, Mass.	110 to 250	20	Diffused white light.
1	New Haven, Conn.	145 to 215	30 to 90	Pale green color. Streamers at intervals nearly to zenith.
1	New London, Conn.	140 to 240	45 to 90	A diffused glow, resembling the dawn. About 12 streamers reaching an altitude of 55°.
1–2	Toms River, N. J.	135 to 225	90	Long narrow strips of pink, red, and white shot up to zenith.
1	Alpena, Mich	90 to 270	35	Band of white light, with beams of pale straw color moving rapidly back and forth.
1	Boon, Mich	.....	.....	Arch; beams of yellow light appearing and disappearing rapidly, a motion from w. to e.
1	Marquette, Mich	225	90	Luminous patches; streamers to 20° s. of zenith.
1–2	Sault Ste. Marie, Mich.	135 to 270	40 to 90	Tea-green color. Waves of light moving from w. to e.
1	Minneapolis, Minn.	180 to 225	90	Streamers of white and rose-color nearly to zenith.
1–2	Bismarck, N. Dak.	110 to 250	40	Pale, diffused light, lasted until 2 a. m.
1	Rapid City, S. Dak.	.....	50	Beams resting on a dark segment.
1–2	Havre, Mont	.....	10 to 45	Arch, with luminous beams to 30°. Bright flashes to zenith, moving with great rapidity, and having a rolling motion. At 1.20 a. m. flashes to 60° s. of zenith.
1	Miles City, Mont.	.....	.....	Diffused light; later an arch with bright flashes.
1	Rosalia, Wash.	150 to 240	25	Display resembling a hazy light, resting on a dark segment. A few small streamers in n. at 5.10 p. m.

EARTH CURRENTS AND MAGNETIC STORMS.

Notwithstanding the extensive distribution of the aurora of November 1st no account has come to hand of any important disturbance of electric telegraph work, whence we must infer that the ground currents during this aurora were feeble in North America.

STATE WEATHER SERVICES.

[*Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.*]

The following extracts and summaries are republished from reports for November, 1893, of the directors of the various state weather services:

ALABAMA.

Temperature.—The mean was 0.8 above the normal; maximum, 86, at Maple Grove, 4th; minimum, 15, at Chepultepec and Decatur, 25th.

Precipitation.—The average was below the normal; greatest monthly, 5.14, at Thomasville; least monthly, 0.73, at Fort Deposit.

Wind.—Prevailing direction, north.—*F. P. Chaffee, Local Forecast Official, Weather Bureau, Montgomery, director.*

ARIZONA.

Temperature.—The mean was 3.0 below the normal; maximum, 89, at Buckeye, 1st; minimum, 11, at Flagstaff, 20th; greatest monthly range, 64, at Crittenden; least monthly range, 40, at Peoria.

Precipitation.—The average was 0.20 below the normal; greatest monthly, 1.87, at Payson; least monthly, 0.00, at Teviston.

Wind.—Prevailing direction, southwest.—*W. Burrows, Observer, Weather Bureau, Tucson, director.*

ARKANSAS.

Temperature.—The mean was 1.0 below the normal; maximum, 82, at Camden, 23d, and at Corning, 22d; minimum, 5, at Winslow, 4th; greatest monthly range, 74, at Keesees Ferry; least monthly range, 48, at Prescott.

Precipitation.—The average was 1.43 below the normal; greatest monthly, 5.71, at Madding; least monthly, 2.03, at Gaines Landing.

Wind.—Prevailing direction, south.—*F. H. Clarke, Local Forecast Offi-*